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ARTICLE



Unraveling the hindering factors of digital public service delivery at street-level: the case of electronic health records

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ABSTRACT

There are several elements as to why digitization of public services is progressing slowly. Many explanations center on structural aspects of public institutions and their capacity and capabilities to implement digital tools. Others highlight the uptake by citizens as key to making technical solutions in the public domain work. This paper draws attention to a third line of argumentation by focusing on the role of street-level bureaucrats. Based on the assumption that they are caught in between the technical details of digital public service delivery and the organizational context in which these tools are implemented, the goal is to identify some of the factors that hinder the use of digital applications by street-level bureaucrats. To unravel those hindering factors, we use the “failed” implementation of electronic health records in the United Kingdom as an example in order to link it to existing research on digital governance and street-level bureaucracy. We conclude that the disconnect between organizational structures and digital tools is magnified at street-level, which may threaten discretionary power and autonomy of public servants and can make daily tasks more complicated and time-consuming. Policy implications drawn from this include, paying special attention to the trade-off between local autonomy regarding the adjustment of digital tools and national guidance and standardization as well as the distinction between the potential inability of public servants to use the tools due to limited training or age and the unwillingness linked to a loss of power and discretion.

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Digital public service delivery; e-government; policy implementation; street-level bureaucrats

1. Introduction

A recent report by the European Parliamentary Research Service (EPRS 2017) finds that the level of digitization of public services is relatively low due to a combination of legal, organizational, and other obstacles. This, in combination with high levels of investments and limited impacts, has been named the “e-government paradox,” which

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describes two decades of investments and no evident impact to justify those costs (Bertot and Jaeger 2008; Castelnovo 2010; Misuraca, Savodelli, and Codagnone 2014; Savoldelli, Codagnone, and Misuraca 2014). In the discussions around the slow implementation of digital public service delivery, many arguments focus either on overall public sector support through organizational structures and capabilities (Helfat et al. 2007; Comuzzi and Patel 2016) or on the acceptance and use by citizens (Henningsson and Van Veenstra 2010; UN-DESA 2010). Both perspectives raise issues that concern the structure of public institutions as well as their capacity and capability to handle digital applications and the underlying data architecture. From a citizen perspective, issues center on accessibility, usability as well as ability to use digital tools for public services.

In this paper, we want to draw attention to a third dimension that can hinder implementation of digital infrastructures in government. We focus on the role of street-level bureaucrats in implementing digital public services. We thereby follow Lipsky's (1980) definition:

The essence of street-level bureaucracies is that they require people to make decisions about other people. Street-level bureaucrats have discretion because the nature of service provision calls for human judgment that cannot be programmed and for which machines cannot substitute. (Ibid, 161)

With the implementation of e-government, public policy decisions have become increasingly mechanical through the "cementing of rules and routines in standardized software" (Carasan 2015, 585). This also limits the opportunities for situational adaptation to the circumstances of individual cases. This kind of discretion is at the heart of Lipsky's understanding of street-level bureaucrats where civil servants have a central position in the interaction between individual citizens and the administrative apparatus. While decisions by street-level bureaucrats have always been limited by legal rules and principles as well as organizational checks and balances, the digital dimension adds another layer. "Knowledge management systems and digital decision trees have strongly reduced the scope of administrative discretion" (Bovens and Zouridis 2002, 8).

There are two counter-running arguments that are currently being made about the role of civil servants in a digital public service environment. On the one hand, there are examples where digital applications enable public servants in their activities. The main argument underlying this "enablement thesis" (Buffat 2015) is that the processing of routine information can be automated, which frees up time for more personalized interaction of street-level bureaucrats with citizen-clients. Digital tools also allow managers to move away from a tight command-and-control system since oversight is partially handled by digital performance, this, in turn, leaves more room for the creative instincts of civil servants (Goldsmith and Crawford 2014). Finally, digital applications can empower street-level bureaucrats, because problems can be identified and solved faster (Fernandez and Moldogaziev 2013; Goldsmith and Crawford 2014).

On the other hand, some argue that "frontline discretion decreases with the increasing role of ICT" (Buffat 2015, 152). This is motivated by two observations: First, the information that digital programs provide is often not of central relevance to street-level bureaucrats and instead of adding value to daily work, takes up time

for training and handling. In other words, digital systems are currently unable to grasp the full complexity of street-level choices. Second, parts of decision making are shifting to other actors, such as IT specialists and system designers, who are responsible for designing software which guides – and sometimes even takes over – street-level bureaucrats’ actions and decisions (Buffat 2015).

In this context, we follow the second line of argument. We use the case of electronic health records (EHR) implementation by the UK National Health Service to identify potential misfits between digital tools and the street-level context in which these tools are used for providing services. This is then tied to theoretical arguments being made in the literature to highlight policy recommendations and find common themes for future research in the field of street-level bureaucracy and digital governance.

2. The implementation of electronic health care records in the UK

Several countries are in the process of adopting electronic healthcare records; however limited acceptance by clinicians presents a threat to its implementation (Gagnon et al. 2014). An often cited example of a failed system is the introduction of comprehensive EHR in the UK. Health records mainly come in different formats (paper and electronic) and are stored in a range of systems that are rarely interconnected. In contrast, “EHR are digital records of a patient’s health and care” (House of Parliament 2016, 1), containing information available to primary, secondary and social care providers, and to patients simultaneously. The idea behind it is not only easier access to information in one place, but also freeing up professionals so they can spend more time caring for patients (Department of Health and Social Care 2013). Thereby, there is a distinction between hospital administrators, who oversee the implementation in a management position and clinicians that deal with patients directly and use the IT system on a daily basis. We focus on the latter group, since they experience the potential costs of the implementation of such as system in terms of increased time spent learning and navigating it (Bernier, Detmer, and Simborg 2004; Ilie, Courtney, and Van Slyke 2007; Trimmer et al. 2008).

The UK implementation of EHR started in 1992 as part of the “National Health Service’s Information Technology Strategy” with subsequent strategies in 1998 and 2002. The expectation of the NHS was that it would:

- Reduce time and effort in accessing information about patients;
- Allow for remote monitoring of patient progress;
- Improve service planning and closer align capacity with demand;
- Coordination and integration of care across different departments and organizations (Honeyman, Dunn, and McKenna 2016).

“Running from 2002 to 2011, the new system failed to achieve its main objectives – including establishing an integrated EHR system across secondary care” (Honeyman, Dunn, and McKenna 2016, 3). Focusing specifically on the implementation of such as a system in the context of hospitals and the work of medical staff, the challenges experienced throughout the implementation of EHR can be categorized along the following

three dimensions: (1) Misfit between the IT system and existing power relations; (2) misfit between the IT system and the daily workflow, and (3) autonomy issues.

Misfit between IT system and existing power relations

In general, hospitals have limited control over the systems that are being implemented. This has to do with contractual agreements that the government enters when setting up the system. This results in a lack of influence on how the software is configured for specific scenarios inside the hospital. At the same time, private suppliers focus on “the delivery of the product rather than on its quality, the process of delivery, achieving meaningful use, and wider consequences of implementation” (Sheikh et al. 2011, 4). In addition, stakeholders at decision-making level – largely national-level – underestimate the time needed to build, configure, and customize technology while at the same time training and supporting end-users. In the course of the UK EHR implementation, a dividing line further formed among the management level and those using the system on a day-to-day basis. The availability of data and data management tools was seen as positive by hospital management personnel, since information on processes was available in real-time, searchable, and retrievable, whereas clinicians working with the system evaluated it largely negatively (Honeyman, Dunn, and McKenna 2016).

Sheikh et al. (2011) further find a difference between senior and junior clinicians in using such software. This has to do with the hospital hierarchy and the fact that senior clinicians are able to delegate online data entry to junior staff while keeping their old routine of paper-based records. Campbell et al. (2006) also point out that when the system is unable to fully support the work routine of one clinician within their shift or delays processes, this work is being transferred to others, leading to resentment and ineffective work synchronization. Together these issues point toward several potential power asymmetries within the hospital system, starting at national level where hospital representatives were not involved in choosing and customizing the software. Similarly, hospital management is able to better monitor processes, but clinicians are reluctant to change their routine or increasingly delegate data entry to junior staff (Campbell et al. 2006; Sheikh et al. 2011). Some even point to the fact that power shifts toward the IT department, since hospital staff becomes dependent upon their expertise and problem-solving capabilities to keep the system working (Campbell et al. 2006). The implementation of digital software thus has put existing power relations under pressure, or potentially enlarged existing power asymmetries.

Misfit between IT system and daily workflow

There are several issues raised in connection to the daily workflow of clinicians in studies focusing on the implementation of electronic systems in hospitals settings generally and for the UK specifically. One issue that Campbell et al. (2006) observe is the use of temporary paper records that are then transcribed digitally. Digital records are being printed or manually transcribed from the database to paper-based administration records by nurses, then used for reference and notes by doctors. This additional information is then re-entered into the digital database (Sheikh et al. 2011). Standardization of forms also leads to delays in data entry or even data entry that is

incorrect. For example, clinicians who are unable to find the correct data entry location often use a “miscellaneous” section to fill in vital information that might be overlooked by peers or has to be found in a time-consuming way for following clinicians (Campbell et al. 2006).

In a hospital setting, clinicians further receive alerts through the system that have to do with potential medication cross reaction, follow-up treatments, or missing information about the patient/the treatment plan. With an electronic system in place, these alerts have grown in number, which slows down the work processes, as clinicians have to “pause to decipher alerts, deliberate on whether and how to respond and potentially document reasons for not complying with alerts” (Campbell et al. 2006, 549; Honeyman, Dunn, and McKenna 2016).

In those UK hospitals where digital systems have been installed, clinicians have also been spending additional time on system-related issues. For example, in Cambridge University Hospitals, “staff reported time-lags between information being recorded on handheld devices and appearing on monitors” (House of Parliament 2016, 3). This led to delay in patient care and follow-up with staff, which was time consuming. In addition, new workstations and handheld devices throughout the hospital needed to be configured with the online system, interrupting existing clinical work patterns (Care Quality Commission 2015; House of Parliament 2016).

Ilie et al. (2009) further find digital accessibility issues, which include a physical dimension related to “the ability to find a computer that is convenient (near a patient’s room) and available (not in use by someone else)” (Ibid, 217) and a logical dimension that describes accessibility related to logging onto the system digitally. For the latter dimension, Ilie et al. (2009) point out that security measures require clinicians to have long passwords with a combination of alphabetic, numeric, and special characters that must be changed frequently and are thus hard to remember. Physicians also visit patients in different parts of the hospitals, which requires them to log on several times throughout their shift, prolonging their work day:

For me to log into the computer, if the computer is right here, takes me a minute and a half. If I have forty patients multiplied by one and a half minutes, you got at least one hour for that every day ... The computer is not there always, so it’s an average of two to three minutes. If I have forty patients, then it’s two to three hours extra. (Ilie et al. 2009, 221)

The physical limitations linked to the digital system have further led to physicians switching back to paper-based records. Clipboards are conveniently located outside each patient’s room, while digital records have to be accessed through a workstation of which a limited number exists throughout the hospital and they could be occupied by other clinicians. The paper-based information needs to then be manually entered into the system later and for this time the patient record is not up-to-date and new information inaccessible to other staff.

Finally, accessibility is also determined by the training that staff receives to handle the system and familiarize themselves with its features. This aspect is especially prominent during the beginning of the implementation phase. Thereby age plays a role as junior doctors adapt to new systems quicker than senior staff (Venkatesh, Sykes, and Zhang 2011; House of Parliament 2016).

Autonomy issues

As a separate issue that prevents the implementation and use of digital systems in hospitals, Walter and Lopez (2008) show that “the perceived threat to professional autonomy has significant, negative direct influence on perceived usefulness of an IT and on intention to use that IT” (Ibid, 206). They find that perceived usefulness is independent of functionality of the system itself and instead physicians feel threatened that the system could take over decision-making processes. Beyond electronic medical records, which simply store patient data to be edited and retrieved by clinicians, clinical decisions support systems enable the system to create professional advice. This includes diagnostics, treatment options, prescription advice, and care planning.

This process codifies knowledge for clinical decision-making previously held exclusively by physicians. Since the potential effect of codification of knowledge is outside access of previously exclusive domain of a profession, which, in turn, threatens professional autonomy, IT that codifies more knowledge can be perceived as more threatening to professional autonomy (Walter and Lopez 2008, 14).

Summary

Together, these aspects of the UK EHR implementation show a lack of customized, easily available options for delivering services digitally and a complicated process for remediating issues in the system. While hospitals differ in their set-up compared to many other public service institutions due to their varied workforce, complex processes and multiple objectives of caring for patients, educating new physicians and nurses as well as research (Boonstra, Versluis, and Vos 2014), the issues highlight some of the obstacles linked to implementing digital systems for public service delivery.

Committee members for the NHS project have blamed ministers and civil servants for its failure (Syal 2013). The UK Government however argues that the program was too centralized and insufficiently sensitive to local circumstances. The National Audit Office (2011) at the time found that while the electronic systems simplified automated administrative procedures, clinical ones that are linked to decision-making by providers, for example which drugs to prescribe for a patient, were not realized. Other reports point toward the fact that because technicians unfamiliar with the healthcare system developed the electronic forms, physicians were at times unable to work with them.

In the following sections, these obstacles are linked to existing literature on implementing digital governance and street-level bureaucracy in order to identify future research streams and policy recommendations. We distinguish between a structural dimension, describing the implementation of *e-government*, and the digitization of street-level bureaucracy addressing the implementation of *services*.

3. Structural dimension of e-government implementation

A theme that runs through the literature on the implementation of digital services within organizations is that of the misfit between digital systems and existing

organizational structures, meaning that e-government changes are not accompanied by similar transformations in institutional arrangements (e.g. Lips and Schuppan 2009). Andersen and Henriksen (2006) find that there is an artificial separation of technological and institutional change that leads to a variety of challenges during IT implementation. This implies that technical structures are layered on top of unchanged organizational ones, which creates tension. Kitchin (2014) also points toward the overemphasis on the technology rather than more profound organizational reform. The focus on the technological dimension of implementing digital tools pulls resources from setting up information management systems that address the ways in which data are integrated into decision-making for civil servants (Giest 2017).

Andersen and Henriksen (2006) further highlight that while digital strategies are developed at national level, the connection of the technology to the individual case worker and the citizen-client is often disregarded. National digital government plans are a “top-down” procedure where central governments supervise the design and execution of e-government initiatives. This has to do with the interoperability of different systems, as well as organizational, legal and financial reasons (Anthopoulos, Siozos, and Tsoukalas 2007). At local level, this raises concerns over the fact that under time pressure, some of the digital structures add to the complexity of carrying out public tasks and are a reinforcement of existing silos of people, IT, and data (Copeland 2015). Several scholars suggest that digital applications could therefore reinforce pre-existing organizational structures and power relations, rather than changing them (e.g. Kraemer and King 1986; Lips and Schuppan 2009; Pollitt 2011).

Another aspect raised in the context of e-government is that the use of big data and some of the new technologies connected to it require more privatization and contracting out of government (Meijer and Bolivar 2016). At the same time, officials often have no experience with these private players, which can lead to issues in implementation (Radin 2003). There is further evidence that specialization of services to the point that external input is needed aggravates coordination issues (Wollmann 2002). These issues can pertain to coordination among IT specialists and national governments as well as management and higher government levels. The UK case highlighted this in the evaluation of EHR implementation where findings pointed toward limited collaboration among several levels within the public service.

Taken together, these structural factors both limit the scope in which street-level bureaucrats can utilize digital tools as well as their usability in day-to-day decision-making processes. The following section focuses in more detail on the tensions that may arise in street-level contexts where officials actually work with – or are required to work with – the digital tools in providing services to citizen-clients.

4. Digitizing public services at street-level

The street-level bureaucracy literature offers possible explanations for civil servants’ unwillingness and inability to utilize digital tools. Street-level bureaucrats are defined as the implementers of public policy, who have discretion to apply abstract policies and rules to concrete cases (Lipsky 1980). As part of their daily job, they have face-to-face encounters with citizen-clients. Their work has changed considerably because of digitization and automation. Tasks that were traditionally conducted by street-level

bureaucrats, such as collecting information and archiving, are now carried out by computers (Bovens and Zouridis 2002). Bureaucracies are using digital systems to make routine decisions and at times replace street-level bureaucrats altogether (Snellen 2002). However, many organizations still employ street-level bureaucrats, exactly because human judgment is regarded as necessary to provide individualized services to citizen-clients, and to be able to deal with complex cases and unforeseen circumstances that cannot be pre-programmed. To highlight the nuances for limited uptake of digital tools at street-level, we distinguish between the willingness and ability of street-level bureaucrats to work with them. Whereas ability is linked to resources such as access to training, available time and skills, willingness has to do with the way power and discretion is affected by digital tools.

Power and discretion

Information technologies are considered as mode of control by various actors in the policy implementation chain. Having certain knowledge is regarded a power base (Snellen 2002). The relationship between managers and street-level bureaucrats can be described as a principal-agent relationship, where managers have an information deficit regarding the actions of street-level workers, who possibly pursue goals or make decisions which are not in line with broader organizational goals. To these managers, the use of IT tools – such as decision support technologies – to monitor street-level bureaucrats' decisions reduces the information asymmetry, and thereby offers them more control. Managers are better able to compare actions and decisions across bureaucrats, and to standardize these decisions by offering guidelines. Jorna and Wagenaar (2007), for example, show how IT helps managers to more closely monitor the formal aspects of street-level bureaucrats' work. For street-level bureaucrats this entails that they are held accountable in a hierarchical way (Hupe and Hill 2007), possibly curtailing their discretion to make decisions as they see fit (Buffat 2015).

Depending on the kind of discretion that street-level bureaucrats have, they could be more or less willing to work with these technologies.

The influence of management on frontline work might further be perceived as less problematic by bureaucrats working for hierarchical bureaucracies than by bureaucrats who work for professionalized organizations. The former may be used to working with “weak discretion,” and to interpret rules within a given framework, whereas professionals are used to having “strong discretion,” and room to maneuver (Evans and Harris 2004). In short, professionals expect from managers to trust them with discretion (Hupe and Hill 2007), and being held accountable hierarchically could hamper professionals' sense of autonomy, making them less willing to use digital technologies (cf. Gofen 2014). Moreover, the technologies aimed at standardizing decision making may conflict with street-level bureaucrats' expert knowledge and goals. Whereas street-level bureaucrats have face-to-face contact with citizen, and take into consideration the specifics of each case, digital dossiers and decision support technologies allowing them to only fill out specific “text blocks,” could make individualized decisions more challenging (Wastell et al. 2010). Although the coupling of databases may support street-level bureaucrats in making decisions (Snellen 2002), they could also feel that their expert knowledge is disregarded in favor of efficiency and

efficacy. Whereas digital templates could be experienced as useful “reminders,” they could thus also be seen as diverting attention away from “real problems” (Checkland, McDonald, and Harrison 2007). Research has shown that street-level bureaucrats prefer information assessed in face-to-face interactions with citizen-clients over information generated by digital systems (Raaphorst and Groeneveld 2018). Looking specifically at the NHS case, we have seen that physicians, who can be depicted as professionals having “strong discretion,” perceive a digital system as less useful, and feel threatened, when it codifies knowledge that previously belonged to their professional discretion.

As a response to this, rules embedded within the digital system may be creatively interpreted in order to compensate for discretionary space taken away by digitization (Evans and Harris 2004). Studies have shown that there is a disparity between street-level bureaucrats’ informal use of discretion and what they register (Jorna and Wagenaar 2007; Wastell et al. 2010). As such, management control is primarily virtual control of formal aspects (Jorna and Wagenaar 2007). This means that the implementation of IT might come across as successful for managers at the surface, but that actual practices might look entirely different from the picture presented by the digitally registered information. For example, using paper-based records and then entering this information into the digital system at a later stage.

Resources

Filling out digital dossiers can be experienced as burdensome by street-level bureaucrats, as it adds to already existing tasks they need to fulfill. When street-level bureaucrats do not receive more resources such as time and information, this could lead to a “public service gap” in which they have to “do more with the same” (Hupe and Buffat 2014). Existing research has shown that street-level bureaucrats find it impossible to completely fill out digital records within given time constraints, due to the high workload (Wastell et al. 2010; De Witte, Declercq, and Hermans 2016). The NHS case has shown that entering new information, logging into the system, responding to system alerts, and spending extra time on non-routine work as the result, have enlarged this public service gap, since these activities take more time and effort on top of day-to-day tasks.

Besides time, street-level bureaucrats’ skills to work with new technologies and new types of knowledge in their day-to-day encounters with citizen-clients are also of relevance. Frontline officials often do not have a full understanding of the complexities of digital support systems, and can therefore not oversee the consequences of their use of technologies (Meijer 2009). The lack of skills could also affect officials’ ability in using digital tools. Computer literacy, defined as the ability to utilize computers for various tasks, could also explain how street-level bureaucrats use digital technologies (Busch and Henriksen 2018). The possession of this personal resource could differ across ages, where younger street-level bureaucrats are better able to make use of the different features of technology than the older ones (Busch 2017).

The street-level bureaucracy literature suggests that when the number of constraints exceeds the number of action resources, street-level bureaucrats find strategies to deal with this public service gap (Hupe and Buffat 2014). In order to deal with

time pressures imposed by digital systems, street-level bureaucrats, for instance, only fill out “x” in obligatory fields, in order to continue working with the system and complete the case in time (De Witte, Declercq, and Hermans 2016). Another study has found that street-level bureaucrats extend required timescales by informally redefining the category “assessment” as the moment when the professional assesses the client, rather than the production of the document (Wastell et al. 2010). In the same vein, street-level bureaucrats who experience a high workload because of digitalization, either due to time constraints or due to a lack of skills, may use digital tools as if they do not allow room for interpretation, thereby reducing their discretion (cf. Evans and Harris 2004). By routinizing their use of digital tools, street-level bureaucrats could save time, and/or hide their lack of skills to work with them, which would make their work easier (cf. Tummers and Rocco 2015).

To conclude, when an increase in action prescriptions, of which e-government implementation is only one example, is not accompanied by a change in resources such as time and training, street-level bureaucrats are likely to employ coping strategies since they simply *cannot* fulfill all requirements. These coping strategies, in turn, could shape whether and how digital technologies are used.

5. Policy implications and concluding remarks

The paper has the goal of partially unraveling the e-government paradox by focusing on the challenges of digital public service implementation at street-level to shed light on the mismatch between the level of investment and the results realized. The literature has so far paid limited attention to the role of street-level bureaucrats in this context. In the paper, we bring together streams of existing research under the umbrella of the UK EHR case. In order to identify potential policy recommendations, we approach the case with the supporting conceptual frameworks as a lesson-drawing opportunity. Both the environment (hospitals) and the context (the UK) make this case unique; however, given the more general mechanisms of willingness and ability of street-level bureaucrats in combination with structural components, we draw out the following hurdles that need to be addressed.

First, there is a structural challenge to implementing digital tools in the public sector. This has to do with existing hierarchies and the accompanied power asymmetries. From the UK case, it became clear that a balance has to be struck between the local autonomy in adapting digital systems to daily work routines and standardizing system elements at higher levels. The EHR system showed that complex digital forms, which were not accessible or available for daily tasks, slowed down work processes, and increased the work load by searching for specific fields to be filled in, excessive alarms, or using paper-based forms that needed to be made digital. Giving clinicians the freedom to adjust various features however would limit the ability to transfer information from the system to other hospitals or GPs. Hence, there is a trade-off between street-level input on digital tools and standardization at higher levels. In short, policymakers need to be aware of local obstacles to implementation and finding a balance between street-level adjustments and national guidance.

Second, the EHR case showed that there are nuances as to why clinicians do not use the system or do not use it properly. These have to do with – what we call – the

willingness and/or ability of street-level bureaucrats. The latter one refers to the resources available that impact the way digital tools are used. This potential “public service gap” can be addressed through additional training as well as incremental implementation in combination with individual factors, such as age and seniority. The case highlighted that the pressure to progress quickly had unintended consequences at individual and organizational level, such as entering data into the system later or relying on paper-based records. Further, it showed that younger staff adjusted quicker due to previous IT knowledge, whereas senior, and also older staff, tended to delegate digital tasks to junior colleagues. Willingness, on the other hand, has to do with the power and discretion of individual street-level bureaucrats within the context they are working in. Depending on the kind of discretion that street-level bureaucrats have, they are more or less willing to work with these technologies, because they feel that their expert knowledge is disregarded in favor of efficiency and efficacy. In addition, expert knowledge is a source of power for street-level bureaucrats, which is impeded by digital systems that have built-in decision support and monitoring features. The case pointed towards such dynamics in studies that found that the perceived threat to professional autonomy has significant, negative direct influence on perceived usefulness of digital systems (Walter and Lopez 2008). This implies that thought has to be given to which aspects of street-level activities should be digitized and how these tools complement existing expert knowledge.

These aspects are a starting point for future research on the topic in other public (health) settings. Two aspects of particular interest are, the potential connection between the degree of expertise of street-level bureaucrats and their willingness to work with digital tools, and second, systematically examining under what conditions digital tools are perceived as extending or limiting the public service gap (Hupe and Buffat 2014). This would entail a comparison between street-level bureaucrats with varying levels of professionalization to examine how expert knowledge (as opposed to lay knowledge) relates to the use of digital technologies. Further, analyzing the interplay between e-government features, available resources, such as time and training, and street-level bureaucrats’ ability to use those tools.

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